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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/672,069	09/28/2000	Yukihisa Takeuchi	789_048 NP	7280

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EXAMINER

BUDD, MARK OSBORNE

ART UNIT

PAPER NUMBER

2834

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/672,069  
Filing Date: September 28, 2000  
Appellant(s): TAKEUCHI ET AL.

**MAILED**  
MAY 03 2006  
**GROUP 2800**

Stephen P. Burr & Timothy D. Evans  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 3-17-06 appealing from the  
Office action mailed 10-19-05

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**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

4612440 Brunnee et al 9-16-1986

4805057 Ogawa et al 2-14-1989

6140739 Arai et al 10-31-2000

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

claims 3, 4, 6-13 and 68-76 are rejected under 35 USC 103 (a) as being unpatentable over Brunnee in view of Arai and combined with Ogawa (057). Brunnee (figures 3, 5, 7 and 9) teaches a piezoelectric actuator comprising a pair of mutually opposing thin plate sections #27, #28, a fixation section #25 and a movable section #12, #13 including a slot which has sides parallel to the thin plate sections. That is to say, the movable section defined by #12, #13 has a slot defined by the parallel surfaces that are opposite from the sides that screws #29 penetrate. A similar slot is defined in the base #25 between parallel surfaces opposite to the surfaces which are penetrated by the screws #29. The driving piezoelectric elements #14, #15 of Brunnee are only a single layer and do not extend onto either the fixation section or the movable section. However, the substitution of multiple electroded thin layers of piezoelectric material for a single layer of piezoelectric material is well known per se. On the one hand, increasing the number of layers yields a higher displacement in a known, predictable matter. On the other hand, for an equal total thickness of piezoelectric material, multiple thin layers allow an equal displacement with less input voltage (more efficient but

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More costly). While these relationships are notoriously well-known to one of ordinary skill in the art they are also explicitly taught by Ogawa (057) at column 1 lines 44-51. Thus, for the above reasons it would have been obvious to one of ordinary skill in the art to provide multiple piezoelectric layers in lieu of the single layer used by Brunnee. To extend the piezoelectric material on to either a fixation section or a movable section would have been obvious for the following reasons. As taught by Arai (column 10, lines 9-18) (also figures 9-12) placing the piezoelectric thin films to lie over the fixation and movable elements (areas of greatest stress) improves the efficiency of the device. Although this passage describes a sensing function of the piezoelectric material #14 it is noted that the piezoelectric material #14 is also used to drive the device (note function of electrodes #17 #18 in figure 5). Another reason as taught by Ogawa (057) is so that "the lead wires can be connected to two parts of the monolithic by morph member #31 which are not substantially displaced" (see column 5, lines 30-38). Thus, for either of these reasons it would have been obvious to one of ordinary skill in the art to extend the piezoelectric material of Brunnee on to either the fixation section or the movable section.

#### **(10) Response to Argument**

Applicant argues that Brunnee itself rebuts the examiners asserted motivation for moving the piezoelectric elements to a location as shown in Arai to provide the claimed structure. The examiner disagrees. While applicant is correct in noting that there is no stress point on the thin plate member where it intersects the

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movable member, there is stress at the joint between the fixation member and the thin plate since this is where bending of the thin member would take place when the movable end is displaced. Also, extending the piezoelectric material means that the entire length of the thin element is driven rather than only a portion of the thin element, therefore, increasing displacement. Thus, the examiner cannot agree that extending the piezoelectric element of Brunnee to extend on to either the fixation section or the movable section would be of no benefit.

Applicant further argues that Brunnee itself rebuts the examiners asserted motivation for using the stacked type piezoelectric element from Ogawa to provide the claimed structure. Again, the examiner must disagree. As specifically taught by Ogawa (057) column 1 lines 44-51 the use of multiple layers in lieu of a single layer of equal thickness allows for the use of a lower drive voltage. Thus, the examiner cannot agree with applicants contention that Brunnee can in no way benefit from the teaching of Ogawa and that the motivation to combined references is actually useless. Applicant contends that Brunnee cannot benefit from increased displacement since the displacement is essentially fixed due to the width of the slot. This does not negate the converse benefit of more displacement per unit of voltage supplied by using a multilayered structure in lieu of a single layer of piezoelectric material.

Applicant's final argument is that Brunnee rebuts the examiners asserted motivation for using terminals located on a surface of the outermost layer of the piezoelectric layers as shown in Ogawa to provide the claimed structure. The argument is based on Brunnee using a conductive material for #30. This ignores the fact that Brunnee does not have to use a conductive material for the thin sections. Nor does it take into consideration that extending the piezoelectric material on to the fixation and/or movable sections would completely cover the surface of #30 thereby necessitating the use of same side terminals. In other reason for providing same side terminals when using a stack a piezoelectric elements in lieu at a single element is the ease of manufacture, specifically the polling operation. Note Ogawa column for lines 8-50. Thus, same side connections are beneficial regardless of whether or not a conductive thin member is used.

Under MPEP section 1205.03 (A): if the evidence appendix and related proceedings appendix are missing, but the record is clear that there is no evidence submitted and no related proceedings listed in the related appeals and interferences section, the examiner may except the brief and state in the examiner's answer that it is assumed that the appellant meant to include both appendices with a statement of "NONE". As such, it is assumed by the examiner that it was appellant's intent to include both appendices with a statement to of "NONE"

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

  
Mark Budd

Conferees:

Darren Schuberg 

Drew Dunn 

Jeff

TC2800

Organization \_\_\_\_\_ Bldg./Room \_\_\_\_\_

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